CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

CALIFORNIA'S HEALTHY SOILS INITIATIVE

CALIFORNIA WATER BOARD'S WATER QUALITY COORDINATING COMMITTEE

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CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

cdfa

CALIFORNIA AGRICULTURE

$47

Billion worth of ag production in 2015

400

Different types of commodities

76,400

farms that cover 25.5 million acres

1/3

of all vegetables

2/3

of all fruits and nuts

www.cdfa.ca.gov/oefi/healthysoils/HSInitiative

CALIFORNIA DROUGHT

2014 – 428,000 acres (173,200 hectares) out of production

- Direct cost agriculture $1.5 billion

2015 – 540,000 acres (218,500 hectares) out of production

- Direct cost to agriculture $1.8 billion

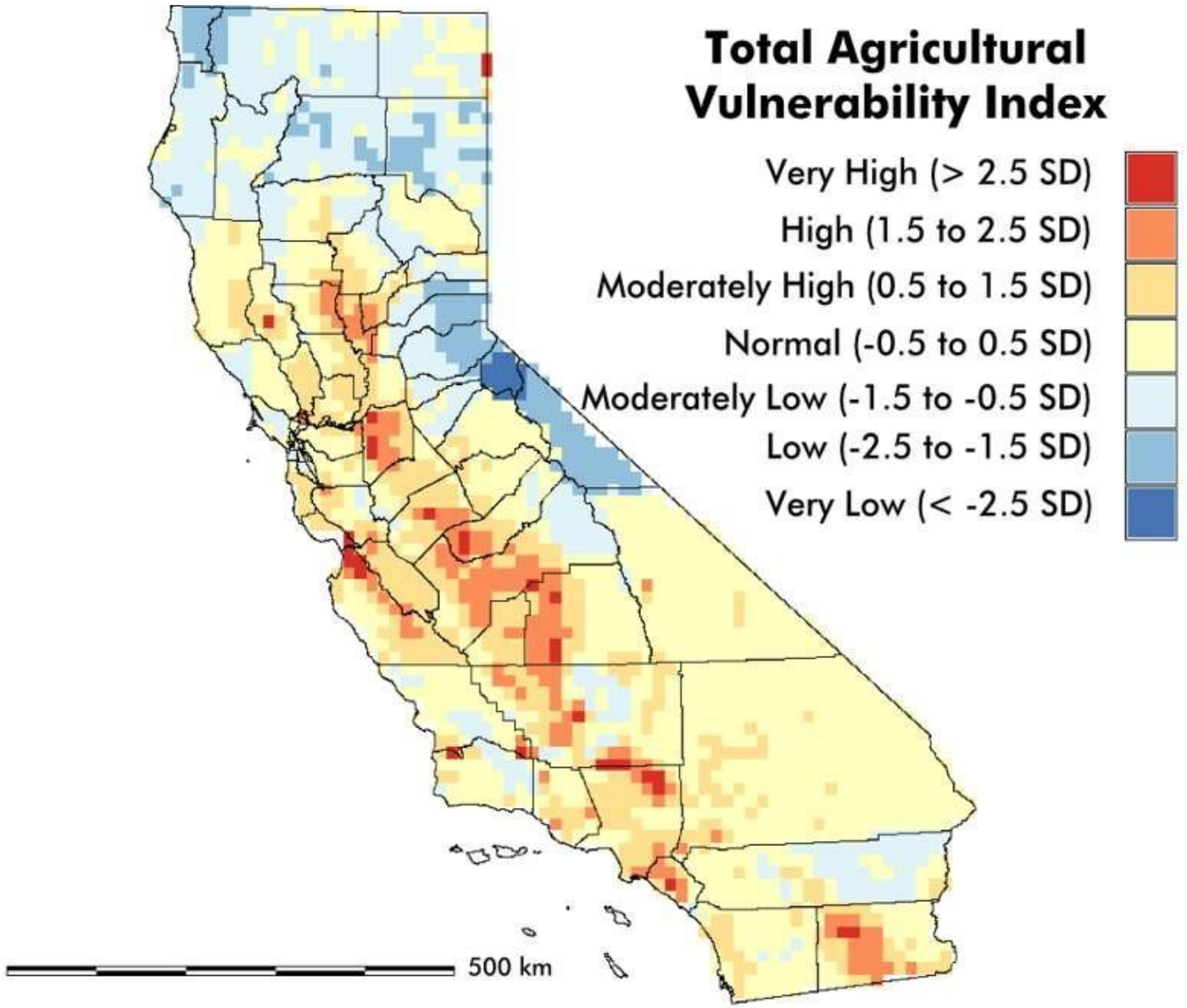
2016 – 78,780 acres (31,500 hectares) out of production

- Direct cost to agriculture $550 million

Climate Change Vulnerability

Vulnerability Index uses 4 sub indices:

1. Climate
2. Crop
3. Land use
4. Socioeconomic



Study by Jackson et al. UC Davis with funding from CEC

Climate Smart Agriculture

Climate Smart Agriculture is an integrated approach to achieving greenhouse gas (GHG) reductions while also ensuring food security in the face of climate change.

- *Sustainably increasing farm productivity and incomes.*
- *Adapting and building resilience to climate change.*
- *Reducing/removing greenhouse gas emissions, where possible.*

$180 million

investments in Climate Smart Agriculture Programs since 2014

- Dairy Digester Research & Development Program
- The Healthy Soils Program
- State Water Efficiency Enhancement Program
- Sustainable Agricultural Lands Conservation Program
- Alternative Manure Management Program

HEALTHY SOILS INTIATIVE

An Interagency Plan to Reduce Greenhouse Gases and Improve Drought Resiliency by Innovating Farm and Ranchland Practices

- Increase water retention
- Improve plant health and yields
- Reduce sediment erosion and dust
- Improve water and air quality
- Improve biological diversity and wildlife habitat

Actions for Healthy Soils Initiative

- *Protect and restore soil organic matter in California's soil*
- *Identify sustainable and integrated financing opportunities*
- *Provide for research, education and technical support*
- *Increase governmental efficiency to enhance soil health on public and private lands*
- *Promote interagency coordination and collaboration*

HEALTHY SOILS ARE...

Full of Life

One teaspoon of healthy soil contains
100 million to 1 billion individual bacteria

Well Structured

Healthy **soil is**

made of about
- 45% minerals
- 25% water
- 25% air
- 5% organic matter

USDA United States Department of Agriculture
Natural Resources Conservation Service

HEALTHY SOILS AND PEST MANAGMENT

- Healthier soils produce crops that are less damaged by pests
- When stress is alleviated, a plant can better resist pests
- Healthier soils harbor more diverse and active populations of soil organisms that compete with, antagonize and ultimately curb soil-borne pests

HEALTHY SOILS AND NUTRIENT MANAGEMENT

- Nutrient cycling: Soils with higher carbon and biological activity promote cycling of nutrients making nutrients available to plants and other organisms as needed

- Filtering contaminants: Healthy soils can reduce the amount of contaminants, (e.g. antibiotics or heavy metals) that enter the freshwater supply

- Study: Cover crops can reduce nitrate leaching losses by over 60%

http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2387&context=usdaarsfacpub

HEALTHY SOILS AND WATER MANAGMENT

- **Greater holding capacity:** Healthy soils have strong soil structure which results in an increased ability to hold plant-available water.

- Healthy soils loses less water to runoff and evaporation.

- Fact: Healthy soil can hold up to 18- 20 times its weight in water!

unlock the SECRETS IN THE SOIL

Check in with YOUR growers about healthy, productive soils.

Soil Health Management Systems can help America's growers feed the nation and the world through sustainable conservation practices. The guide below provides an at-a-glance view of specific sustainability benefits associated with soil health improving practices. It is important to note that not all practices are applicable to all crops, Some operations will benefit from just one soil health practice, while others may require additional practices for maximum benefit.

By following four basic soil health principles, producers can improve their soil health and sustainability:

1. Keep the soil covered as much as possible
2. Disturb the soil as little as possible
3. Keep plants growing throughout the year to feed the soil
4. Grow a variety of plants to diversify soil

Soil Health Management Systems include:

How does it help environmentally and economically?

	DECREASES PEST PRESSURES	IMPROVES NUTRIENT USE EFFICIENCY	IMPROVES WATER QUALITY	CONSERVES WATER	IMPROVES PLANT HEALTH	IMPROVES WATER EFFICIENCY TO CROPS	SAVES NON-RENEWABLE RESOURCES	IMPROVES AIR QUALITY	INCREASES PLANT POLLINATION
Conservation Crop Rotation Growing a diverse number of crops in a planned sequence in order to increase soil organic matter and biodiversity in the soil.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cover Crop An un-harvested crop grown as part of planned rotation to provide conservation benefits to the soil.	✓	✓	✓	✓	✓	✓	✓	✓	✓
No Till A way of growing crops without disturbing the soil through tillage.			✓	✓	✓	✓	✓	✓	
Mulch Tillage Using tillage methods where the soil surface is disturbed but maintains a high level of crop residue on the surface.			✓	✓	✓	✓	✓	✓	
Mulching Applying plant residues or other suitable materials to the soil surface to compensate for loss of residue due to excessive tillage.	✓		✓	✓	✓	✓		✓	
Nutrient Management Managing soil nutrients to meet crop needs while minimizing the impact on the environment and the soil.		✓	✓		✓	✓	✓	✓	
Pest Management Managing pests and promoting the growth of healthy plants with strong defenses, while increasing stress on pests and enhancing the habitat for beneficial organisms.	✓	✓	✓		✓	✓	✓	✓	✓







SANO FARMS

Firebaugh, CA

"…our goals: to improve soil, fuel and equipment economies,…and water capacity. We've also seen improved yields and quality."

- Alan Sano and Jesse Sanchez

50%
in soil organic matter

12-15%
in tomato production

50%
in fertilizers

33%
in water

Healthy Soils Incentive Program

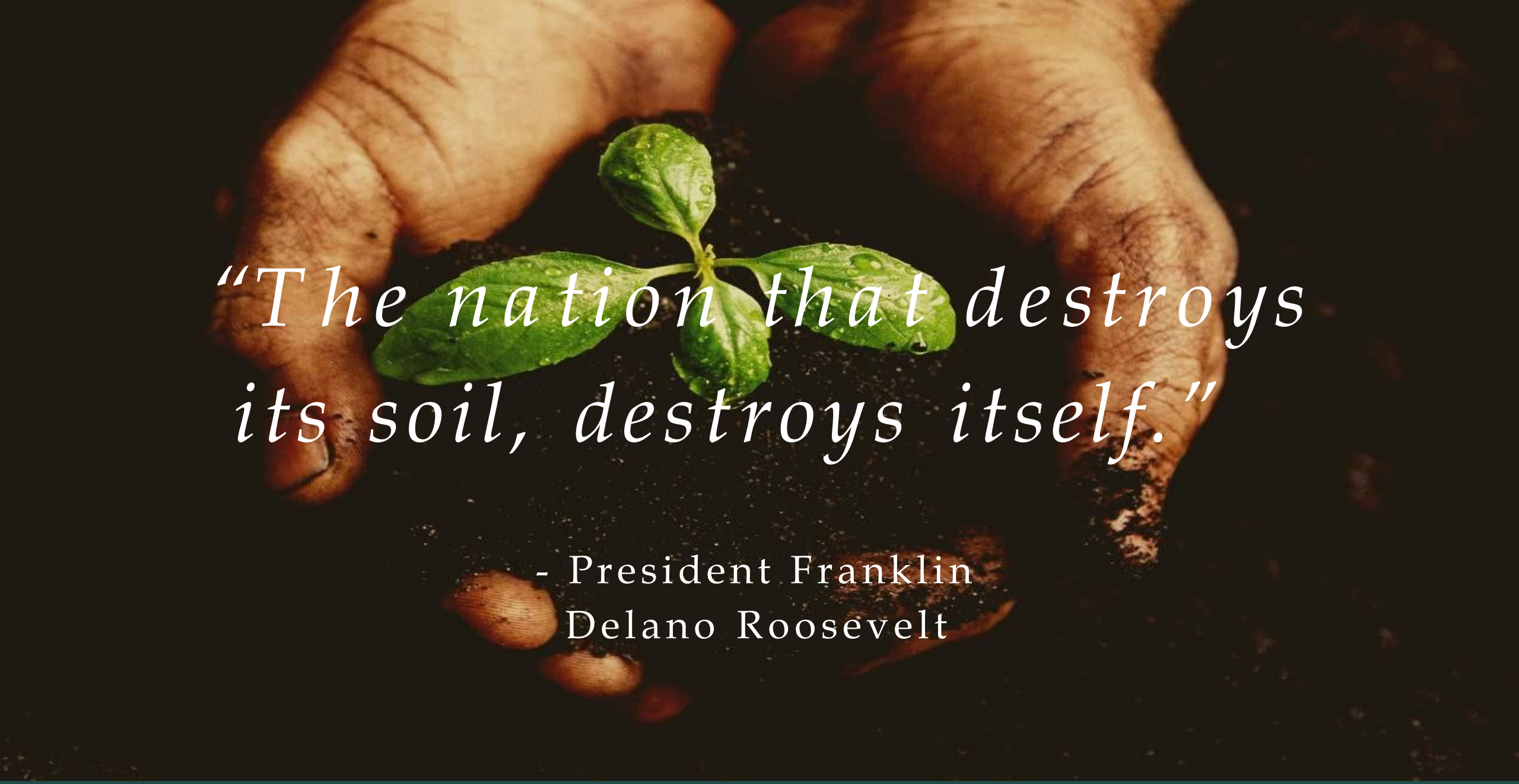
HSI creates incentive and demonstration programs to build soil carbon and reduce agricultural greenhouse gas (GHG) emissions.

$7.5 MILLION

allocated to CDFA to develop the HSIP program

96

projects have applied for funding in the latest rounds


“The nation that destroys its soil, destroys itself.”
- President Franklin Delano Roosevelt